

[0208] Through holes are formed in the passivation film 321, and pixel electrodes which connect to the drain electrodes 308 through these through holes are formed by a transparent conductive film made of, e.g., ITO. An acrylic-based photosensitive resin is formed on the entire surface to have a film thickness of about 2 μm to 8 μm , thereby forming an insulating layer 1202. This insulating layer 1202 is irradiated with light to form holes in regions corresponding to the pixel electrodes 310. Into each hole, droplets of a hole transporting layer 1203, light emitting layer 1204, and electron injecting layer 1205 are sequentially dropped by an inkjet method or the like. The thickness of the insulating layer 1202 is preferably large because the hole transporting layer 1203, light emitting layer 1204, and electron injecting layer 1205 are stacked in the holes described above. As the light emitting layer 1204, a polyparaphenylenevinylene-, polyallylene-, or polyfluorene-based light emitting material can be used. As the hole transporting layer 1203, polyethylene.dioxythiophene.polystyrene.sulfonic acid salt (PEDT/PSS) or the like can be used. As the electron injecting layer 1205, it is possible to use, e.g., an oxadiazole derivative (OXD), PBD, triazoles (TAZ), phenyl-quinoxaline, or Alq. However, the materials are not limited to those enumerated above.

[0209] Subsequently, a common electrode 1206 electrically connecting to the electron injecting layer 1205 of each pixel is formed on the entire surface. This common electrode electrically connects to the electrode 312 to apply the voltage of this electrode 312 to the electron injecting layer 1205. As the common electrode 1206, it is possible to use, e.g., a metal or alloy having a low work function and covered with a metal or alloy for a line, Al—Ca, Al—Li, or ITO. It is also possible to switch the electron injecting layer and hole transporting layer, i.e., to stack the electron injecting layer, light emitting layer, and hole transporting layer in this order from below. Furthermore, a transparent common electrode may be used to emit light from the upper surface.

[0210] A seal 108 is formed around the pixel region. An array substrate (formed by bonding a first plastic substrate 104 to a first thin glass layer 101) on which parts up to the common electrode 1206 are formed is bonded to an opposing substrate (formed by bonding a second plastic substrate 107 to a second thin glass layer 105). As the seal 108, it is possible to use, e.g., an ultraviolet ray curable resin mixed with inorganic fillers having a reduced gas permeability can be used. After the two substrates are coupled, this seal 108 is hardened and bonded by irradiation with ultraviolet rays. A gas such as dried nitrogen can be sealed in a gap 1201 between the two substrates. Furthermore, a getter agent for water or oxygen, e.g., a desiccant or oxygen absorbent may be formed on the surface or on a portion of the second thin glass layer 105, and high-purity grease or organic liquid may be sealed.

[0211] A display device using an organic EL must be entirely sealed to prevent deterioration of the electrodes, light emitting layers 1204, and the like under the influence of the atmosphere such as water and oxygen. In this embodiment, the first and second thin glass layers 101 and 105 can prevent permeation of, e.g., water and oxygen from the substrate surfaces. These thin glass layers are preferably made of non-alkaline glass. A thin glass layer about 1 μm to 150 μm thick can prevent permeation of gases. When the spacer 1207 is formed on the insulating layer 1202 by using

a photosensitive organic resin or the like, the distance between the two layers can be held constant. As in the first embodiment, the characteristics of the adhesion layer in the pixel region are different from those of the adhesion layer in the peripheral region. Accordingly, the same effects as in the first embodiment can also be obtained.

[0212] The sixth to 12th embodiments described above are explained as modifications of the first embodiment, but these embodiments are not limited to modifications of the first embodiment. That is, the sixth to 12th embodiments may be modifications of the second embodiment in which the properties of the plastic substrate in the pixel region are different from those of the plastic substrate in the peripheral region, modifications of the third embodiment in which the properties of both the adhesion layer and plastic substrate in the pixel region are different from those of the adhesion layer and plastic substrate in the peripheral region, modifications of the fourth embodiment in which the properties of the plastic substrate in the pixel region are different from those of the plastic substrate in the peripheral region and the plastic substrates in these two regions overlap each other, or modifications of the fifth embodiment in which the properties of both the adhesion layer and plastic substrate in the pixel region are different from those of the adhesion layer and plastic substrate in the peripheral region and the plastic substrates in these two regions overlap each other.

[0213] Furthermore, the display device manufacturing method of each embodiment may be the method of the first embodiment by which first and second non-alkaline glass substrates are first coupled and then thinned to form thin glass layers, or may be a method by which a first non-alkaline glass substrate having an element circuit region and the like formed on it is first bonded to an intermediate substrate via a temporary adhesion layer and then thinned to form a first thin glass layer, this first thin glass layer is bonded to a first plastic substrate, and then the temporary adhesion layer is removed. In this case, the manufacturing steps as shown in FIGS. 3A and 3B through 6A and 6B is firstly performed to thin the element formation substrate 201, thereby obtaining the thin glass substrate 101. Then, as shown in FIGS. 27A and 27B, the opposing substrate 501, for example, is opposed to the thin glass substrate 101 to form a display cell. Thereafter, the plastic substrate 104 is bonded to the thin glass substrate 101 to complete a display device.

[0214] As has been described in detail above, the present invention can provide an active matrix type display device by which active elements can be formed with high yield by using a plastic substrate which is light in weight, and a method of manufacturing the same.

[0215] Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.